

## OUR ASTRONOMICAL COLUMN.

SEPTEMBER METEORS.—September has long been known for the abundance of fireballs which it supplies, and apparently the present month will justify this reputation. On September 2 a large meteor was observed from Redruth and Falmouth, Cornwall, falling among the stars in the south-east region of Pegasus. On September 7 two fireballs were seen from near Bishop's Stortford. The first of these was observed at 8h. 56m. descending almost vertically a little to the right of the planet Saturn. The other made its appearance at 11h. 22m., but details are wanting.

DANIEL'S COMET, 1907d.—Numerous reports of observations and photographs of Daniel's comet are now coming to hand, and show this object to be one of unusual interest.

The *Comptes rendus* for August 26 (No. 9) contains a preliminary description of spectrograms obtained by MM. Deslandres and Bernard. The chief bands shown are those typical of the hydrocarbons and of cyanogen, but there are other, fainter bands which are unfamiliar. An as yet inexplicable difference is noted between the spectrum of the comet's head and that of its tail. A multiple tail 6° in length was shown on a photograph obtained by Mr. Plaskett at the Dominion Observatory, Ottawa, on July 20.

As reported in the *Observatory* for September (p. 364, No. 387), Mr. Melotte photographed the comet with the Greenwich 30-inch reflector on August 10, 11, 12, and 13, and the photographs show a tail some 100' long with fifteen to twenty streamers. On a small-scale photograph secured with the Dallmeyer R.R. lens on August 13, the tail can be traced for about 7° from the head, its general direction being west. The streamers curve to the south and spread out in a fan-like form.

In No. 4198 of the *Astronomische Nachrichten*, Herr H. H. Kritzinger points out that the earth will, on September 12, pass through the straggling portions, if there be any so far behind the main body of the comet, and that any meteors occasioned by the collision will have as their apparent radiant  $\alpha=23\text{h. } 8\text{m.}, \delta=+3^\circ$ .

COMET 1881 V.—A note by Mr. Denning, published in No. 387 (p. 363, September) of the *Observatory*, recalls the fact that the return of the periodical comet discovered by him on October 4, 1881, is due this year.

According to Dr. Mathiessen's elements, the period is 8.68 years, and it therefore returned in 1890 and 1899, but its position rendered it invisible. This year its position indicates the same favourable conditions as obtained in 1881, when it was calculated to have been visible to the naked eye in August, before its discovery. The comet is of interest from the fact that at one point in its orbit it approaches to within  $3\frac{1}{2}$  million miles of the earth. The following is from a search-ephemeris calculated by Dr. Smart on the assumption that perihelion passage will take place on October 6 next:—

Ephemeris 12h. (G.M.T.)					
1907	R.A. h. m.	Dec.	log $\Delta$	Bright- ness.	
Sept. 12 ...	7 44.7	+17 50	9.897	...	1.71
" 16 ...	8 13.6	+17 28	9.912	...	1.74
" 20 ...	8 40.8	+16 50	9.930	...	1.72
" 24 ...	9 6.6	+15 59	9.951	...	1.67
" 28 ...	9 30.9	+14 58	9.973	...	1.58
Oct. 2 ...	9 53.7	+13 49	9.995	...	1.47
" 6 ...	10 15.3	+12 33	0.017	...	1.34

From this it will be seen that the comet should now (September 12) be about 21m. west of  $\zeta$  Cancri, and should rise, about 30° north of east, some 5 hours before the sun. On October 3 it will pass a little to the north of Regulus.

THE PARIS OBSERVATORY.—The annual report, for 1906, of Prof. Lœwy, the director of the Paris Observatory, is full of interesting items, of which only a few may be given here. After outlining the present state of the Eros work, the director mentions some instrumental alterations and improvements, and states how satisfactorily a registering micrometer has been found to work used in connection with the Cercle méridien du Jardin. Five hundred and eighty plates of the moon were obtained with

the large equatorial *coudé*, and a number of enlargements of other plates have been made for the tenth section of the *Atlas photographique de la Lune*. A number of photometric observations and experiments on atmospheric absorption were carried on by M. Nordmann with interesting and important results, whilst M. Bigourdan continued his researches on the nebulae. The work on the *Carte du Ciel* proceeds steadily, and 116 enlargements for the chart were prepared during the year; forty-one of these were from Paris, the others from Algiers, Bordeaux, and Toulouse.

THE LATE PROF. S. P. LANGLEY.—No. 1720 (vol. xlix.) of the Smithsonian Miscellaneous Collections is devoted to three interesting addresses delivered, respectively, by Messrs. White, Pickering, and Chanute, at the memorial meeting held on December 3, 1906, "to commemorate the life and services of Samuel Pierpont Langley, secretary of the Smithsonian Institution from 1887 to 1906." Dr. White's address dealt with Langley's work in general, dwelling especially upon his invaluable services to the institution and his ever-readiness to promote the cause of scientific research in every direction. In Prof. E. C. Pickering's address one finds a brief *résumé* of Langley's contributions to astronomy and astrophysics; whilst Mr. Chanute dealt with his work on aerial navigation. An apparently complete bibliography of Langley's published works from 1869 to 1905 is also included in the publication.

THE DISTRIBUTION AND CONTROL OF STANDARD TIME.—A paper of general interest on the subject of time-control is reproduced as an extract from the *Bulletin astronomique* (vol. xxiv.) for May. In it M. Jean Mascart describes the apparatus and method employed for this purpose at the Paris Observatory, discussing each operation separately, and illustrating the text by diagrams of various parts of the system. The causes of accidents and the special artifices adopted for eliminating their possibility form an important part of the paper.

## GEOGRAPHY AT THE BRITISH ASSOCIATION.

THE geographical section of the association met at Leicester under particularly favourable conditions, the quarters provided being airy and spacious assembly rooms in Hotel Street. The meetings were generally well attended, and only in a few cases was any serious falling off in the audience noticeable. The papers were, so far as possible, grouped under the broad subdivisions of the subject, but as some deviations from this arrangement were necessary, in order to suit the convenience of the readers, it will be well here to disregard the strict order, and bring together the subjects of a more or less similar character.

Besides the opening address of the president, Mr. G. G. Chisholm, which has already been printed in full in these pages, several papers dealt with the specially human and economic aspects of geography, which it had been felt desirable to emphasise as suiting well with the industrial activities of the place of meeting. Communications had been received from distinguished exponents of this side of geography both in France and Germany. Prof. Vidal de la Blache, of Paris, whose writings are noteworthy for the admirable way in which they apply the geographical method to the consideration of human relations, was unfortunately unable to be present in person, but his paper, on the geographical evolution of communications, was read in his absence. Starting from the earliest devices evolved by primitive man as aids in the movement of loads, it traced their gradual improvement under varying conditions of local environment, and especially through the adaptation of animal power to purposes of transport; showing how the vast open plains of Central Eurasia, with the peculiar facilities they offered for the employment of the horse and wheeled vehicle, encouraged the movements of peoples, and brought about the development of long-distance traffic, in which the internal commerce of modern States may be said to have itself originated. While the early beginnings of commercial activity were especially dealt with in this paper,

the most recent developments of economic geography were the subject of the communication by Prof. Max Eckert, the author of one of the best treatises on that subject which has appeared in Germany. Prof. Eckert pointed out that the geography of mankind, understood as the study of the relations of man to his environment, had really only come into existence within the last few decades. While supplying the one adequate bond of union between the natural and moral sciences, it bases all its considerations on the physical conditions of the earth, and evolves general laws regarding the influence of the soil on man and of man on the soil. Commercial or economic geography, which was more specially considered in the latter part of the paper, was defined as a study in which the earth is viewed as the theatre of human production and commerce, one of its most important tasks being the determination of the factors which govern the occurrence of industrial products, though the methods and apparatus of traffic fall also within its purview.

A third paper on the economic side supplied an example of the application of such general principles to a special problem. It was by Mr. J. McFarlane, of Manchester, who set himself the task of determining the limits of the area served by the Port of Manchester, and the character of the trade so carried on. The inquiry had involved much laborious research, the necessary data being obtainable, if at all, only through correspondence with a large number of individuals or bodies engaged in such trade. The material collected, while not permitting a complete answer to the question, was enough to give some indication of the influence exercised by the ship canal as a factor in the commercial relations of the region behind Manchester—an influence which the reader considered likely to increase with time.

One of the afternoon lectures, that by Mr. Mark Sykes, also dealt with the human side of the subject. The attendance was, unfortunately, somewhat small, owing to the counter-attraction of a social gathering, but those who were present listened to a most graphic account of the Kurdish tribes of Asiatic Turkey, among whom Mr. Sykes has travelled very extensively, and whose intricate subdivisions and varying characters he has studied with great care. The number of the separate tribes is astonishingly great, and they differ, not only in religion and language, but in physique, character, and mode of life. The lecturer traced the regional distribution of the principal main groups, and brought home to the audience the physical characteristics of the people by a striking series of photographs. One other short lecture, by Mr. J. D. Rogers, should be mentioned here. It was entitled "Explorers and Colonists," and traced in an instructive way the various motives which have led men to explore—exploration for exploration's sake being, as the lecturer pointed out, a thing of quite modern growth, unless we go back to the first beginnings of travel, and place men like Ulysses in the category of explorers pure and simple. Mr. Rogers spoke of the influence exercised by the imagination in sending the early explorers into remote corners of the world, and traced the connection which in later times grew up between exploration and colonisation.

The mathematical side of geography, which had received attention, outside Section E, both in the address of Sir David Gill and in that of the president of Section A on the figure of the earth, was represented within the section by two papers, both dealing with survey work in Africa. Major Close, R.E., gave a lucid outline of the present state of the official surveys in the several British possessions, showing what a large amount of excellent work is being carried out, often under great difficulties. Captain Behrens, R.E., spoke more especially of the methods of survey adopted, illustrating his subject by instances from special surveys, particularly that of the southern frontier of Uganda, in which he had himself taken part. He also showed upon the screen a number of views in the Ruwenzori range, taken during the expedition of the Duke of the Abruzzi.

Three papers only were concerned with physical geography pure and simple, which it is the modern tendency to leave more and more to the geologist, so far as studied independently of its bearing on man's activities. Prof. J. W. Spencer, who for many years has devoted his atten-

tion to the recession of Niagara, put before the meeting the results of his latest survey, carried out some two years ago on behalf of the Geological Survey of Canada. This has permitted conclusions as to the rate of recession since the date of earlier surveys, and Prof. Spencer finds that this rate is more variable than has been supposed, much depending on the shape of the crest at the time and the varying manner in which the rock is worn away. He has endeavoured to trace the state of affairs in the days of the early visitors to the falls, such as Hennepin, and has found what he considers must have been an old channel of the river in their time. He also spoke of the results of his soundings of the river below the falls. The physical geography of the Etbai desert of Egypt was spoken of by Mr. H. T. Ferrar, of the Geological Survey of that country, who exhibited a large-scale map specially drawn to bring out the physical characters of the country. He discussed various morphological features in regard to their mode of origin, and explained the meanings and mode of use of a number of Arabic geographical terms. Lastly, Mr. M. Allorge described the recently discovered cave of Atoyac, in Mexico, paying special attention to the relation borne by the passages and chambers to the structural planes of the limestone formation in which the cave occurs.

An afternoon lecture by Dr. Vaughan Cornish, on the Jamaica earthquake and its effects as witnessed by himself and Mrs. Cornish, dealt with a physical phenomenon, though much of its interest lay in the vivid way in which the effects of such a catastrophe on the life of the people were portrayed. A thrilling account was given of the personal experiences and sensations of the lecturer and his wife during the earthquake, and the effects on the buildings of Kingston were well illustrated by photographs. Dr. Cornish investigated the place of origin of the earthquake, the character of the shock, and the effects on buildings of different kinds, and he briefly described the methods by which these researches were carried out.

An interesting paper by Mr. R. B. Woosnam described briefly the recent British Museum expedition to Ruwenzori, giving a general account of the features of the range, and especially of the life-zones upon it. The differences between the east and west sides, due to the greater humidity of the latter, were explained, and the question of the modifications or variations of type with change of altitude was briefly touched upon. Nothing very remarkable in the way of special adaptation to the wet and cold of the mountain slopes was noticed, and it was pointed out that the bird most commonly met with in the wettest and coldest zone is a sun-bird of brilliant colour. On the other hand, a species of sun-bird which occurs below 7000 feet is represented above 10,000 feet by another twice the size, though otherwise an exact facsimile; and a similar case occurs among the plants.

Two papers presented detailed studies of special regions from the all-round point of view. Mr. O. J. R. Howarth described the district of Jæderen, in southern Norway, which he showed to possess special characteristics separating it entirely from the typical scenery of that country. The hills rise in partially isolated groups, the whole forming a practically unbroken tract of naked rock, which reveals, to an extent dominating every other feature, the work of the glacier which once covered it. The coast presents exceptionally clear evidences of the upward movement of the land, in the form of old fjords and islands, as well as an old beach, dating from a period of subsidence following that of glaciation, in which last the land stood even higher than at present. The paper indicated briefly some ways in which the distribution of the population had been influenced by the diverse physical characters. The other paper, by Mr. A. W. Andrews, described the Land's End peninsula, an isolated area of old rock separated from the rest of Cornwall by a neck of low land, and thus presenting characteristic features of its own. This granite plateau forms in its higher parts a bare and wind-swept moorland, with undulating hills rising above it. The coast is, as a rule, lofty, with striking granite and greenstone cliffs, and is almost harbourless. The whole area is but little inhabited, though mining was once more actively prosecuted, and there are some signs of a resumption of activity in this direction.

Mr. Andrews showed a number of views illustrating the structure and other features of the district and its coastline.

On one afternoon the section joined with Sections C and K to listen to an illustrated lecture by Prof. Conwentz on the need of preserving what may be called "natural monuments" (typical scenery, flora and fauna, &c.), and the measures adopted or to be recommended to this end. Another lecture, by Mrs. Leonidas Hubbard, presented a graphic account of a journey in Labrador, during which the lecturer completed the work begun by her late husband in the survey of two previously unexplored rivers, the navigation of which is rendered difficult and dangerous by the many falls and rapids. Lastly, a short extempore account of the general and economic characters of British New Guinea was given by Dr. W. M. Strong, a Government official who had just arrived in England on furlough.

Reports were presented by the committees for investigations in the Indian Ocean (Mr. J. S. Gardiner); for the study of the relations between rainfall and river discharge (Prof. McCallum and Dr. Herbertson); and for that of oscillations of land-level in the Mediterranean (Mr. R. T. Günther); and grants were obtained for the further prosecution of the work of the two first.

#### EDUCATION AT THE BRITISH ASSOCIATION.

TWO joint conferences were held, the first with Section H, on *Anthropometry in Schools*. The report of a committee of Section H on anthropometric investigation in the British Isles was presented by Mr. J. Gray (secretary). The anatomical subcommittee reported on methods of taking chest measurements, on hair colours, and on iris colours. A series of schedules of proposed anthropometric measurements for the use of schools has been drawn up, suggestive as to what could be done with limited opportunities. A psychological subcommittee has drawn up a list of thirty-four mental characters, on which they suggest observations on a scale indicating average or more or less marked over or under development of each character. The educational subcommittee (Mr. E. N. Fallaize, convener) states some of the aims of anthropometric observations in schools as the determination of averages and standard deviations, the correlation of physical and mental growth, the detection of the unfit, and the testing of the efficiency of different systems of education. Mr. J. Gray recommended that measurements and observations in all schools should be made in accordance with the scheme of the Anthropometric Committee of the British Association, that the data obtained should be entered on the card schedules, and each subject's dossier kept in an envelope as recommended by the committee. Dr. F. C. Shrubbsall showed some lantern-slides of the results already obtained by anthropometric methods, including a comparison of the relative statures of Jewish and British children, the Jews leading at first, but both alike at age twenty-two; the heights of the professional, commercial, and artisan classes, the professional always leading; the percentage distribution of stature in Scotland, Liguria, and Sardinia, showing the Scottish stature as taller than the Sardinian; a map showing the average statures in different counties of the British Isles; the range of variation at different ages in schoolboys, showing that the tallest aged five was taller than the smallest aged ten. This demonstration was most impressive, indicating both the importance of the results already obtained and the risks of generalising from imperfect statistics or with inadequate knowledge.

The discussion thus begun was adjourned and continued throughout the afternoon. Sir Victor Horsley read a resolution already accepted in the committee of Section L:—"Resolved that, in view of the national importance of obtaining data on the question of physical deterioration, this association urges upon the Government the pressing necessity of instituting, in connection with the medical inspection of school children, a system of periodic measurement which will provide definite information on their physical condition and development." This resolution was afterwards adopted by the general com-

mittee of the association, and, pending further consideration by the council in November, it was agreed that it should be communicated to persons interested without delay.

Prof. M. E. Sadler hoped that a medical bureau would be instituted, preferably by the Board of Education, but with the cooperation of the medical staff of the Local Government Board and of the Home Office. It was desirable that the central authority should give supervision in order that observations may be made on a uniform basis. Mr. J. Ramsay Macdonald, M.P., regarded anthropometrics in schools as a necessary scientific basis for social legislation and educational policy. Mr. E. Meyrick, F.R.S., of Marlborough College, spoke on the practical difficulties in obtaining measurements of growth in school-boys, perturbations and inaccuracies being so considerable that the final results were nearly valueless. Subsequent speakers, thinking perhaps of height rather than of growth (or difference of consecutive heights), freely declared that the accuracy of the measurements did not much matter so long as there were plenty of measurements used in the average, but no one indicated exactly what standards of accuracy were possible or desirable. Mr. Cecil Hawkins, of Haileybury, read a paper on types of physical development in schools. A series of diagrams was distributed having in each case age as the abscissa, and for ordinate either height, weight or girth. Across each of these a series of nearly equidistant curves was drawn to show the progressive development of twenty different grades of boys (each equally probable). This system makes it easy to plot the course of any individual boy and to compare him, not merely with the average, but also with his own type, and to see how his height, weight, and girth are losing or gaining relatively to each other. Prof. Findlay referred to the suggestions of Prof. Armstrong that more might be done to interest the scholars themselves in these measurements and in the necessary calculation of results.

The discussion on *The Scholarship System* afforded a full day's work, the morning being devoted to the transition from the primary school to the secondary day school, and the afternoon to the preparatory school, public school, and university. The opening paper, by Prof. M. E. Sadler and Mr. H. Bompas Smith, greatly assisted the discussion by focusing attention on points raised by their recent inquiry, the results of which will be most welcome on fuller publication. New sections of the community are demanding access to secondary schools, and it has become necessary either to extend the scholarship system or to embark upon a policy of free, or nearly free, secondary education under public control. Maintenance allowances are also necessary. The demand for secondary education has been accelerated by new regulations for the training of pupil-teachers. A scholarship system must give the opportunity of long training for individuals of unusual capacity, and not merely brief but widespread encouragement to average ability. The records kept of the later careers of scholarship holders are at present inadequate, but the evidence points to an overwhelming majority passing into literary, clerical, and other non-industrial callings. The scholarship question should be looked at from a national point of view, not only from the standpoint of the personal advantage and preferment of the individual scholar. Ability should be directed towards those callings in which the individual, by natural aptitude and by physical stamina, can best render valuable service to the nation. Hitherto preferential treatment has been given to the recruiting of the more literary professions. At present special advantage is given to urban districts. The fixed values of the scholarships at public schools and universities might well be reduced, but ample supplementary allowances should be given to those scholars who need them, after private inquiry into the circumstances of each case. The best examinations now conducted for junior scholarships are confined, so far as written tests are concerned, to papers in English and arithmetic. A simple oral test is desirable. The examiners should also have access to the pupil's school record. Stress should always be laid upon physical fitness; this would be an incentive to the healthy up-bringing of children and discourage neglect of the candidate's health. Mr. R. Blair,